

Response of Blast Doors – Test Results and Numerical Simulation

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Summary

An explosion test, designed to monitor the performance and response of sandwich blast doors, is presented. In the test, 100 kilograms of bare high explosives (TNT equivalent) was detonated in free air. The entire charge load was positioned at 1.5 meters above ground level. Five blast doors were tested but only one is discussed in detail in this paper. The blast door was fabricated from truss-core aluminum sections wrapped in 0.8mm thick mild steel sheeting with attendant shear pins and hinges. Broad locks were fitted to improve on an existing design. In the test, the blast doors were arranged in a circle with the explosive charge at the center. Different load intensity on each blast door was obtained by varying the distance from the charge. Details of the experimental set-up, blast overpressure and acceleration records are presented. Numerical simulation of the response of one door is presented to reinforce confidence of recorded data. Details of the numerical model are discussed. Comparison of the velocity and displacement response showed good agreement. The final measured deformation was also in agreement with computed result.